



Complete RF/Microwave probing solutions for every application

Only Cascade Microtech provides a turnkey solution for RF/Microwave measurements. You get not only precision tools (microwave probes, calibration substrates, positioners, cables, state-of-the-art probe station and software) but the most experienced test engineers, applications support, and research team in the industry to ensure your success.

CASCADE® MICROTECH

Innovating Test Technologies®

Make Accurate, Repeatable, On-Wafer High Frequency Measurements



A complete microwave test solution goes far beyond simply connecting the probes, probe station, and test instrumentation. With Cascade Microtech you get not only precision tools, but the analytical test experience you need to make accurate, repeatable, on-wafer measurements.

A complete customized Cascade Microtech RF/Microwave test system includes a Summit series probe station, leading-edge Infinity Probes®, NIST-verified Impedance Standard Substrates, powerful Nucleus® Prober Control and WinCal® Calibration Software, as well as a complete line of accessories.

Our close association with Agilent Technologies ensures that the full potential of your vector network analyzer extends right to the wafer level.

Superior Design

Patented MicroChamber® for Fast, Noise-Free Results

Cascade's integrated MicroChamber® is a low-volume, enclosed area around the chuck, providing a dark, moisture-free, EMI- and RFI-shielded measurement environment for your device under test (DUT).

Ideal for thermal applications, the low-volume MicroChamber purges in less than 15 minutes with dry air or nitrogen for moisture and frost-free measurements down to -55ºC. All probe station controls remain outside the enclosed chamber so you will always have easy access to positioners, microscope and chuck controls – while the DUT remains dry and protected inside.

Easy Wafer Handling

With Cascade RF Stations, wafer handling has never been easier. The locking, rollout stage glides completely forward and clear of the station's platen and frame to effortlessly and safely load 6" and 8" wafers. Even small 1mm wafer shards can be tested with ease.

Thermal Stations

Cascade's thermal 6- and 8-inch manual and semiautomatic stations come with the patented MicroChamber, providing a light-tight, EMI-shielded, wafer enclosure.

With your wafer enclosed in the purged, low-volume MicroChamber, temperature transitions are fast. The system allows on-wafer measurements over a -65°C to 200°C temperature range.

Support for All Your High-Frequency Probing Applications

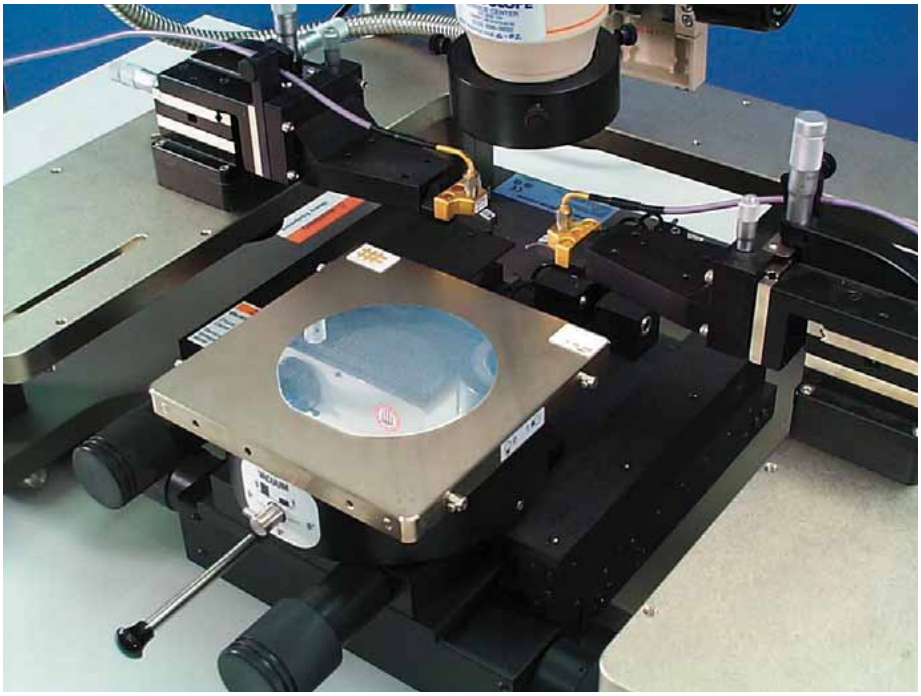
Standard Probe Stations

Cascade's standard 6- and 8-inch manual and semiautomatic stations are modular in design to accommodate the full range of Cascade's microwave tools. They are easy to configure, thus minimizing setup time.

Designed specifically for 6 in. or smaller RF/Microwave wafer probing, the unique square chuck of the 9101 station holds an impedance standard substrate (ISS), contact substrate, and wafer simultaneously to allow quick calibrations and on-wafer measurements.

The square chuck uses vacuum holes instead of rings to eliminate electromagnetic resonance and the possibility of breaking thin wafers.

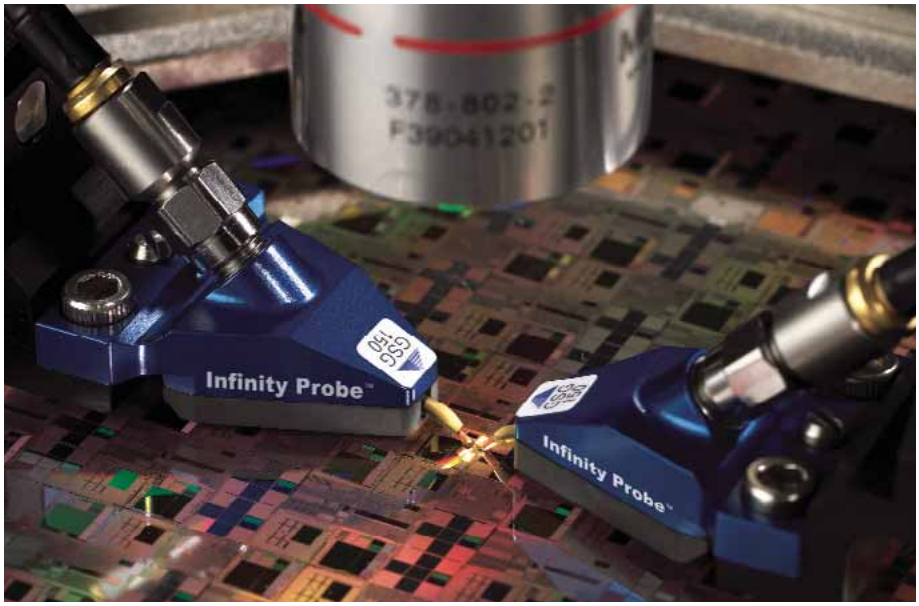
The Summit 11101 and 12101 probe stations couple submicron motion control with a large rigid platen, providing the basis for 200 mm (8 in.) wafer measurements.



The Summit 9101 Station's unique square chuck with independent vacuum controls holds an ISS, contact substrate, and test wafer simultaneously. The station's rollout stage protects your valuable wafers.

Patented Infinity® Probes

Introducing The Infinity Probe, the probe that sets a new benchmark for the device characterization and modeling community. This revolutionary probe combines extremely low contact resistance on aluminum pads with unsurpassed RF measurement accuracy to give you highly reliable, repeatable measurements.



With high frequency performance and low, stable contact resistance on aluminum pads, the Infinity Probe significantly increases productivity and improves the ROI on wafer.

NIST-Verified ISSs

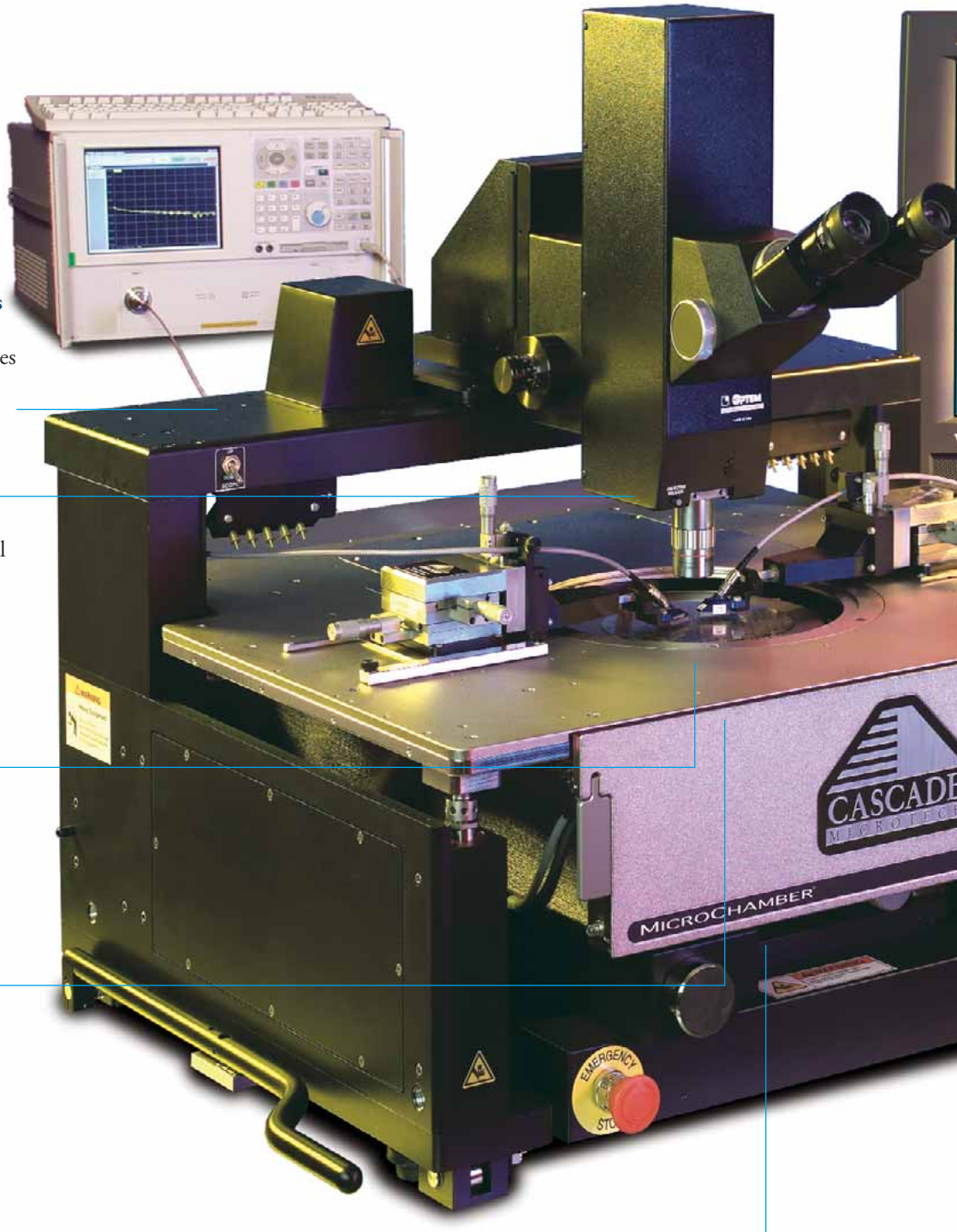
Cascade's family of impedance standard substrates (non-dispersive calibration standards usable through 110 GHz) support all of your high-frequency probing applications, including Pyramid Probe™ cards.

Powerful WinCal Software

Cascade's WinCal™ Calibration Software offers the simplest, most accurate, repeatable, network analyzer calibrations for precision on-wafer measurements. New pad parasitic removal routines incorporated into the software perform one-step corrections for device pad parasitic removal. WinCal assures measurement integrity by allowing you to monitor system drift.

Cascade's WinCal Calibration Software offers the proven accuracy of NIST-verified LRRM calibration with load-inductance compensation. LRM/LRRM calibration, along with Cascade's ISSs, provides the highest accuracy in the industry.

Only Cascade Microtech provides a turnkey solution for RF/Microwave measurements. You get not only precision tools (microwave probes, calibration substrates, positioners, cables, state-of-the-art probe station and software) but the most experienced test engineers, applications support, and research team in the industry to ensure your success.



Agilent Technologies 67 GHz PNA Series Network Analyzer

Convenient connection panels
- Solid anchor for triax, dual triax and quadrax SMU cables - CV meter BNC cables
- Fast reconfigurability for various IV/CV test needs

Sturdy optics mount options
- 25 x 25 mm (1 x 1 in.) High stability tilt-back ideal for probing fine structures (shown)
- Programmable xy transport available
- 203 x 127 mm (8 x 5 in.) Linear lift ideal for array and large-area probing
- Low power microscope boom stand

Patented high performance Infinity probes
Low-loss, durable, reliable family of microwave probes provide superior test performance.

Accommodates multiple positioners
Handles up to four positioners in microwave configurations.

Patented MicroChamber®
Chuck enclosure ensures light-tight, EMI-protected measurements, eliminates dark box making over-temperature measurements easy.

Agilent Technologies
Channel Partner

Advanced Nucleus Prober Control Software on Windows®NT

- Easy-to-use graphical interface
- Multi-user support
- Extensive online help
- Customizable setups
- Voice feedback

Nucleus Software Modules add productivity value. The optional Software Modules can be added to your system to meet your test requirements.

- **Vision** – Alignment of die using the video image. Resolution down to 0.25 microns.
- **AutoProbe** – Software control of microscope and micropositioners with GUI or remote commands.
- **Thermal** – Automatic die size compensation for thermal expansion.



Fast Test/Measurement Automation

- Real-time wafer mapping
- Point-and-shoot probe plan
- IEEE, DDE/OLE support

Easy Viewing

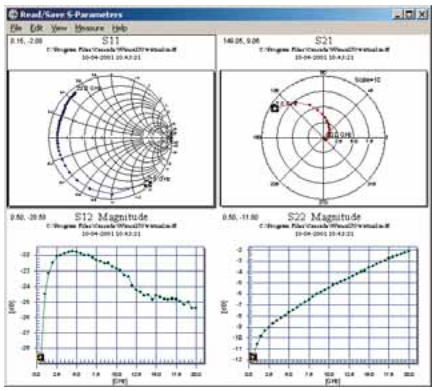
Live video display allows you to track probes. Save video output to file.

Powerful WinCal calibration software

Provides the simplest, most accurate, repeatable, network-analyzer calibrations for precision on-wafer measurements.

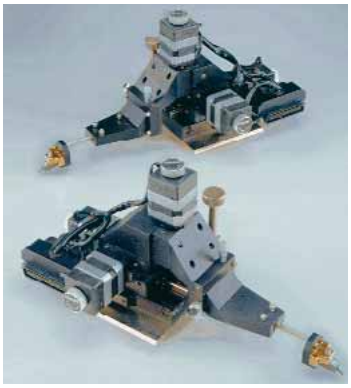
Read/Save S-Parameters within WinCal

Read, display, and store S-Parameter data to file in Touchstone format.



High-Accuracy Programmable Micropositioners

- Hands-off sub-micron device probing
- Enable automatic test and TRL calibrations
- Manual override knobs on x, y, and z axis

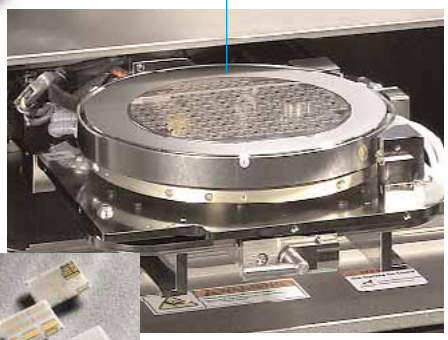


Smart microstepper motors

Fast and precise to ensure submicron chuck movement.

Safely Load and Unload Wafers

Full wafer access via locking roll-out stage.



Quick Access to RF Calibration Standards and Contact Substrate

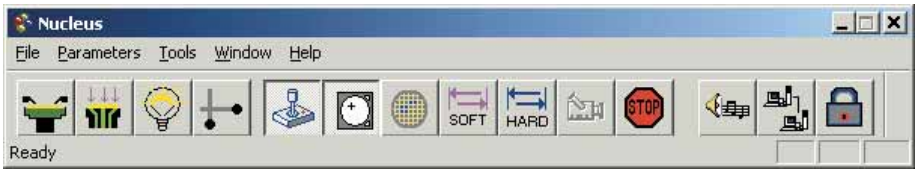
Two patented auxiliary stages with separate vacuum control are incorporated with the chuck. These provide quick access to the calibration standards. These thermally isolated aux chucks ensure that for overtemperature measurements the calibration reference impedance remains at 50Ω.



Convenient vacuum control

For probing up to 200 mm (8 in.) wafers, as well as modules.

Nucleus enables maximum prober reliability and RF test productivity



This next generation prober control software is powerful, yet extremely flexible, easy to learn and use, and allows you to customize the control of your Summit semiautomatic probe station.

RF Application Support

Your RF testing is optimized by Nucleus with essential features that simplify your tasks. Moving to an ISS on the auxiliary chucks is simplified with the aux buttons on the motion control window.

Added safety for your probes has been added with the aux chuck zones. The stage automatically senses when moving from the wafer to the aux chucks and moves down in z before moving between zones.

Stable and Reliable Software

Nucleus uses an ultra-stable 32-bit software core, Nucleus System Manager, designed to run on Windows NT/2000. Together these provide a stable and robust environment for precision wafer testing.

Graphical User Interface

The Graphical User Interface new features include:

- Pop-up HELP
- Right mouse clicks offer useful programming choices
- Customizable toolbars and buttons

Multi-user Support

- Log-in security
- Personalized user ID's for all users
- Save/Restore of all settings

Audio & Voice Prompts

To improve ease-of-use, and increase productivity, Nucleus features customizable user sounds and voice prompts. They provide audible feedback to important probing events and supplement visual actions. You can keep your eyes on the important test wafer, and let the prober speak to you.

Wafer Mapping

The extensive wafer mapping and data configuration editor adds capabilities to maximize test accuracy.

- Real-time data monitoring for Pass/Fail and other tests
- View device performance maps
- Mouse click wafer moves
- Graphical sub-die editor

Productivity Tools

- Extensive online help and user guides
- Tutorial sections are written for new users to help them quickly learn about the time-saving features in Nucleus
- Built-in hardware verification confirms system functionality
- New remote programming tools for building custom test software
- Operator alerts via email, "last die tested" or "vacuum lost," etc.
- 2-point wafer alignment for fast and easy theta setup
- Distance tool for measuring wafer die dimensions

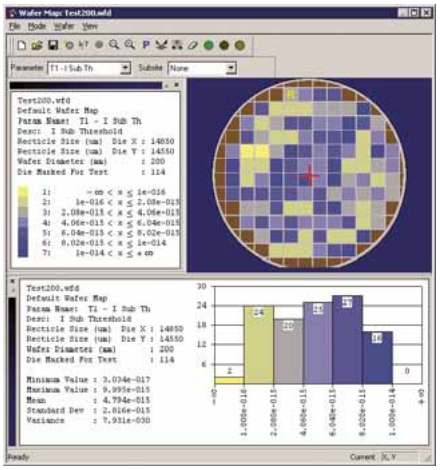
Completing the Test Solution

Integration Tools

Cascade Microtech partners with key semiconductor companies to provide integration tools to develop complete solutions. Whether you want to use an existing test software package or develop your own test software environment, Cascade provides a complete set of tools for an integrated solution. Support for industry standard test software includes Agilent IC-CAP, BTA Technology BSIMPro, RelPro+, Silvaco UTMOST, and many others.

Drivers and sample programs are available for Agilent VEE, LabVIEW, MS Visual BASIC, and HP/TransEra BASIC for Windows.

The user-friendly, iconic-based Visual Engineering Environment, Agilent VEE, is ideal for repetitive measurement automation, and custom test development.



Wafer map parameters give instant visibility to your test results with customizable histogram and legend information. A quick glance at the wafer map shows the status of tests.



Cascade WinCal Calibration Software allows LRRM calibrations, pad parasitic removal, and reads and stores S-parameters in Touchstone format.

- LRRM calibration technique with automatic load inductance compensation
- Supports SOLT, SOLR, TRL and LRM calibrations
- Calibration verification
- Measurement of system drift
- Pad parasitic removal
- Measures, displays and stores S-parameters
- Probe verification (determines S-parameters of the probe)

Cascade Microtech's Systems Measurement Advantages

Measurement	Common Problem	Cascade's Systems Measurement Advantages
Over-Temperature S-Parameter Measurements	Moisture or frost accumulation on wafer, long purge times for dry box	Patented low-volume MicroChamber is purged in < 15 min. with dry air or nitrogen allowing frost-free measurements to -65°C
	System calibration drift is often > 10% over temperature	WinCal software checks stability of probes, cables, and VNA to user-definable limits. Auxiliary chucks hold an ISS for calibration and contact substrates for planarity checks
Load Pull	Inability to measure very low impedances with 50 Ω probes	Partial-matching Air Coplanar probes extend the tuning range of the load-pull system
Noise Parameter	Probe and cable losses limit source gamma and accuracy	Ultra-low loss Air Coplanar probes and source mounting hardware can reduce losses < 0.25 dB max.
RFIC Functional Testing	Power bypass and ground inductance too high to maintain stable device operation	Pyramid Probe™ cards enable unrivaled measurement capability with minimal bypass and ground inductance
F_t Measurements	Pad parasitics mask intrinsic silicon device parameters	WinCal's pad-parasitic removal routines de-embed **F_t** measurements to reveal intrinsic device performance
mm Wave Measurements	Calibration accuracy, data repeatability	WinCal and the semiautomatic probe station offer the highest accuracy in the industry with superior probe placement
On-Wafer TRL Support	Manual probe placement limits calibration accuracy and repeatability	Motorized positioners and WinCal software allow push-button automatic VNA calibrations
Photonics	Laser diode impedances are too low to use a 50 Ω probe for pulsed bias measurements	Resistive matching ACP probes allow broadband impedance matching

Ordering Information



150mm (6") & 200mm (8")	Manual	Non-Thermal	Standard	SUMMIT 910x (6" chuck only)
			Standard	SUMMIT 1110xB **
			MicroChamber	SUMMIT 1120xB **
		Thermal	Standard	SUMMIT 1116xB **
			MicroChamber	SUMMIT 1165xB **
		High Temp Thermal	Standard	SUMMIT 1116xB-HT
			MicroChamber	SUMMIT 1165xB-HT
	Semiautomatic	Non-Thermal	Standard	SUMMIT 1210xB **
			MicroChamber	SUMMIT 1220xB **
		Thermal	Standard	SUMMIT 1216xB **
			MicroChamber	SUMMIT 1265xB **
		High Temp Thermal	Standard	SUMMIT 1216xB-HT
			MicroChamber	SUMMIT 1265xB-HT

Notes:
All 200mm probe stations marked with ** are available with 150mm (6") chucks.
Add "-6" for 6-inch chuck option.
Where x is 1 for Nickel chuck and 2 for Gold chuck

Specifications

X-Y stage manual stations
Travel:
9100-series: 150 mm (6 in.)
11000-series: 200 mm (8 in.)
Resolution: 5 mm/turn (0.2 in.)
Bearings: crossroller

X-Y stage semiautomatic
Travel: 200 mm (8 in.)
Bearings: crossroller
Resolution: 0.1 µm (.004 mils)
Repeatability: < ±1 µm (0.04 mils)
Speed: >50 mm/sec (2 in./sec.)
Accuracy: < ± 2 µm (0.08 mils)

Z stage semiautomatic
Travel: 5 mm (200 mils)
Resolution: 1 µm (0.04 mils)
Repeatability: ±1 µm (0.04 mils)

Microwave thermal wafer chuck with MicroChamber
Cold purge time: 15 min.
Max temp: +200 °C
HT options: 0 °to 300 °C
Min.temp: -65 °C
Flatness: 25 µm
Material: nickel or gold-plated 2 integrated auxiliary stages; independent vacuum controls

Microwave chuck with no MicroChamber
Flatness: 10 mm
Material: nickel or gold-plated
6 in. manual auxiliary stages/vacuum sites: 4
8 in. auxiliary stages/vacuum sites: 2

Facility Requirements
Vacuum: 400 mm (15 in.) of Hg min.
Dry air purge: (thermal systems only) 4.3 liters/sec (9 SCFM)
Compressed air (tilt-back bridge only): 0.1 liters/sec (0.2 CFM @ 55 psi. min.)
Power: 115 V @ 2 A, 230 V @ 1 A

Dimensions
200mm (8 in.) Station: 76 cm (W) x 68 cm (D) (30 in. x 27 in.)
Typical height to eyepieces: 58 cm (23 in.)
Net weight: 165 kg (360 lb.)

Station Accessories
- Impedance Standard Substrates
- Air Coplanar probes to 110 GHz
- Micropositioners, manual and programmable
- Vector network analyzer (VNA) calibration software (WinCal)
- Prober control software (Nucleus)
- Flexible RF cables
- 110 GHz positioners for broadband VNAs

For More Information

Software
Refer to the Nucleus Prober Control Software and WinCal Software data sheets.

9100-Series
Refer to the Summit 9100 Analytical Probe Station data sheet.

Regulatory Compliance
All Summit series stations conform to CE mark and are ETL listed.

CASCADE® MICROTECH

Innovating Test Technologies for better measurements faster

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